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MIT

AMS
TEMPERATURE
SENSORS

AMS-02 Temperature Sensors

- Temperature is measured by:
 - Dallas DS18S20 sensors (connected by busses)
 - PT1000 sensors (point-to-point connection)
- There are several temperature sensor networks:
 - Global Temperature Sensor Network (GTSN)
 - Local Subdetector Temperature Sensor Networks
 - (some “local” temperatures are measured by GTSN – easier to cable)
- Global Network is for top level operations
 - Heaters enable/disable
 - Power ON/OFF
- Local Networks are for low level operations
 - Temperature slew
 - Tracker thermal feedback loops

Global Temperature Sensor Network

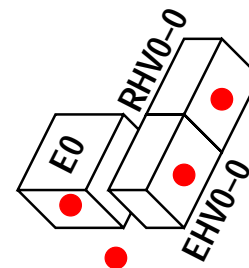
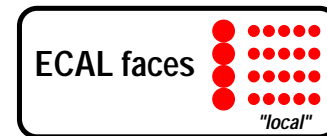
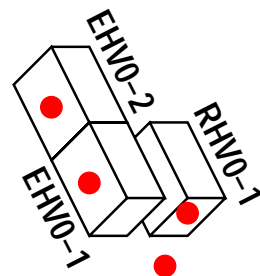
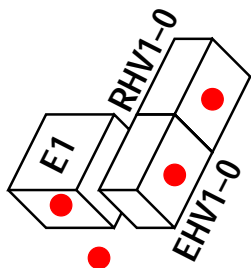
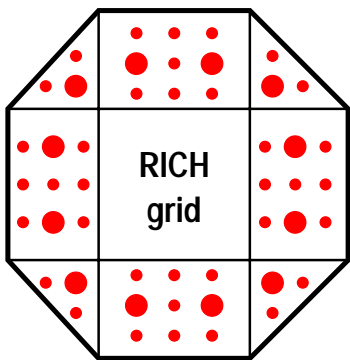
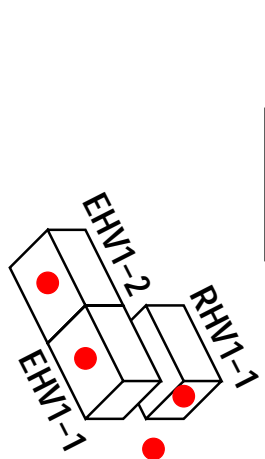
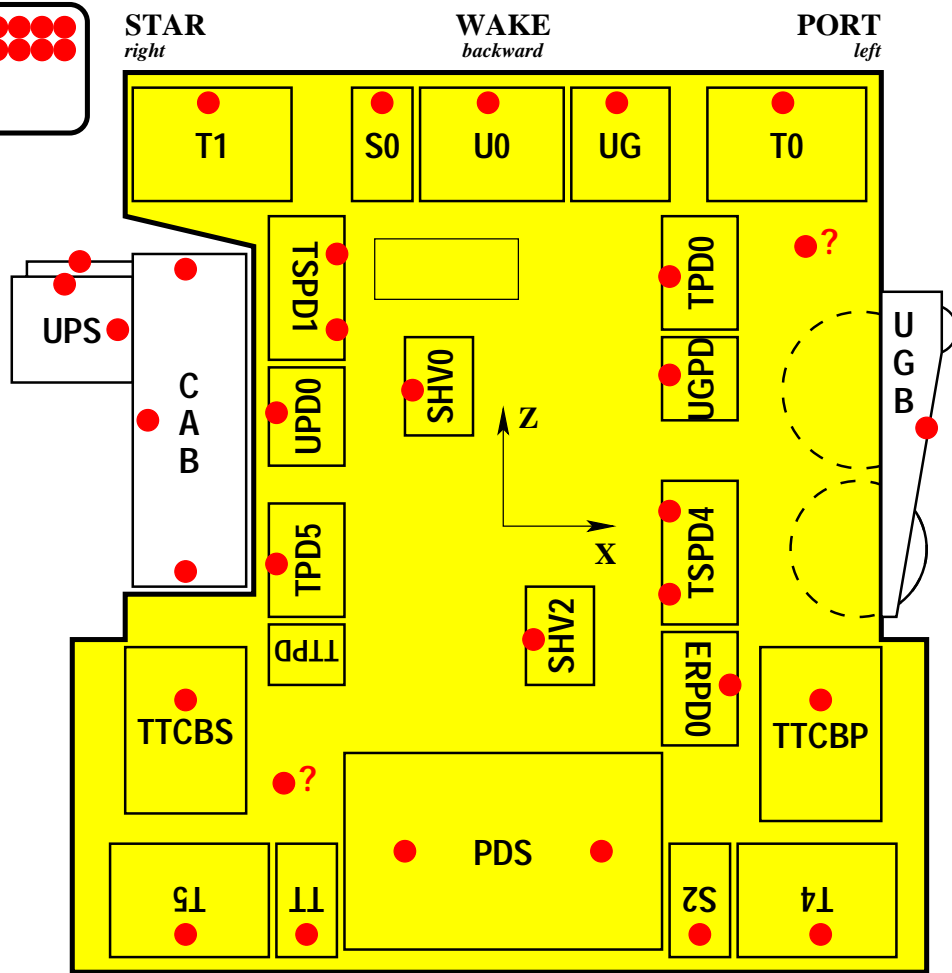
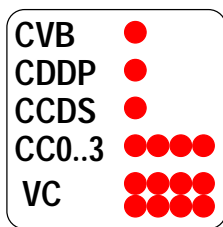
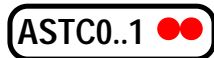
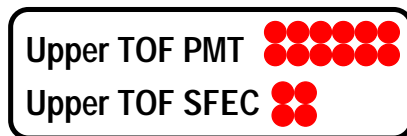
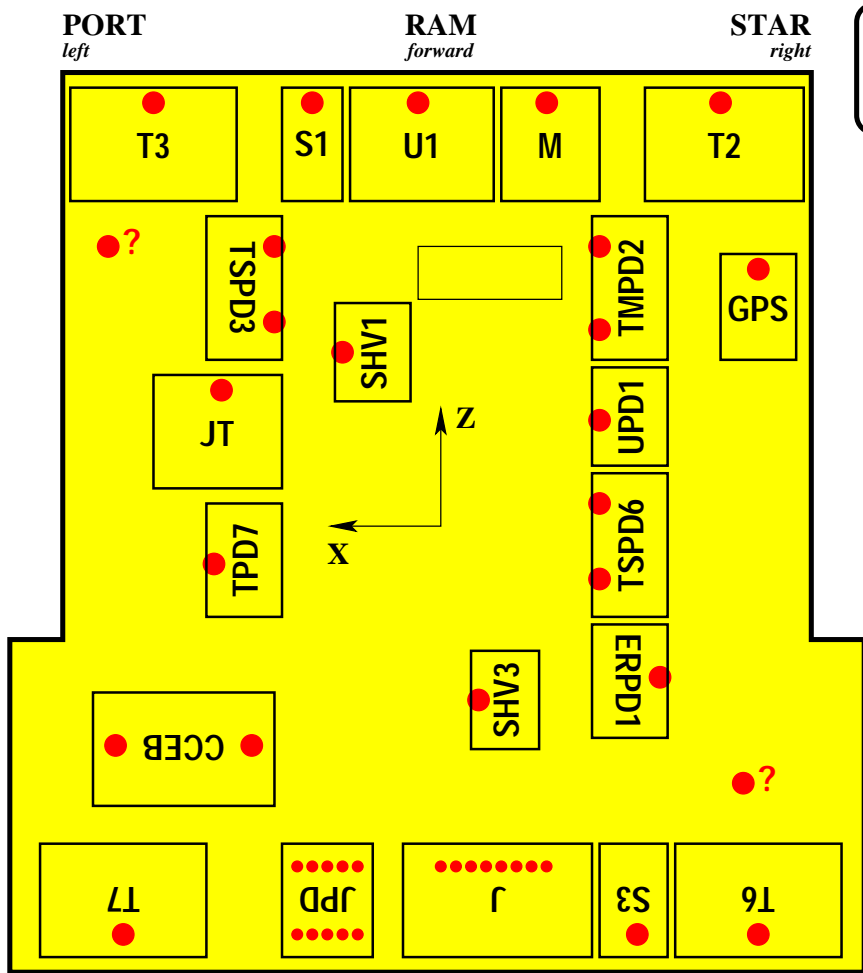
- Dallas busses are connected to USCMs in JPD
- Measures temperatures before subdetector electronics power startup
- A.Koulemzine and S.Fang will make a prototype:
 - PCB with SMD Dallas sensors (design and production)
 - Cable design
 - Cable routing on the AMS-2 mockup
 - Electrical tests
- Next Table and Diagram show the preliminary layout of Dallas Temperature Sensors (DTS) for GTSN

Global Temperature Sensor Network (GTSN)

A.Kulemzin et al.
24 Feb 05

Readout by USCM in JPD - 6 busses 64 sensors each

SubSystem	Measurement location	Points	SubTotal	Total
Cryomagnet system	CAB, upper part, lower part, nearby USS	3	23	199
	UPS0, UPS1, nearby USS	3		
	CVB	1		
	CDDP, CCDS	2		
	CCEB (power side, signal side)	2		
	CC0, CC1, CC2, CC3	4		
	VC	8		
ECAL	ERPD0, ERPDP1	2	38	
	E-Crate0, E-Crate1	2		
	EHV0-0, EHV0-1, EHV0-2, EHV1-0, EHV1-1, EHV1-2	6		
	one on each of four faces	4		
	five on each of four faces (local but readout here)	20		
	USS legs neaby to E-crate and EHV's	4		
J, JT, JPD	J (already included)		1	
	JT	1		
	JPD (already included)			
M	MPD (located in TMPD2)	1	5	
	M-Crate	1		
	ASTC0, ASTC1	2		
	GPS	1		
PDS	A-side, B-side	2	2	
RICH	ERPD0, ERPDP1 (see ECal)		52	
	PMT Grid 2/rectangle, 1/triangle, four each	12		
	PMT Grid 7/rectangle, 2/triangle, four each (local, but readout here)	36		
	RHV0-0, RHV0-1, RHV1-0, RHV1-1	4		
	USS legs neaby to RHVs (included for EHV's)			
TOF and ACC	SPD0, SPD1, SPD2, SPD3 (located in TSPD1, TSPD3, TSPD4, TSPD6)	4	48	
	S-Crate0, S-Crate1, S-Crate2, S-Crate3	4		
	SHV0, SHV1, SHV2, SHV4	4		
	Six on PMTs on each of four planes	24		
	1 on each SFEC (2/plane)	8		
	One on each group of ACC PMT	4		
Tracker	TPD0,TPD1,TPD2,TPD3,TPD4,TPD5,TPD6,TPD7	8	19	
	T-Crate0,T-Crate1,T-Crate2,T-Crate3,T-Crate4,T-Crate5,T-Crate6,T-Crate7	8		
	TT-Crate	1		
	TTCBP, TTCBS	2		
TRD	UPD0,UPD1	2	7	
	U-Crate0,U-Crate1	2		
	UGPD	1		
	UG-Crate	1		
	USS near to Box-S, -C	1		
Thermal System	2 each on Main Ram and Wake Radiators	4	4	



Local Temperature Networks

- Dallas sensors are read out by USCMs in:
 - CCEB
 - UG-Crate
 - M-Crate
- Tracker related only Dallas sensors are read out by TTCE
- PT1000 sensors are read out by:
 - CAB
 - TTCE
 - CCEB
- USCM problems:
 - Too few USCMs – coordination between subdetectors is required
 - How signals arrive in USCM (FP/BP)?
 - USCM modification needed? (remove some parts, add “mezzanine board” proposed by W.Karpinsky)?
 - Nonstandard USCM front panel design?
 - USCM space qualification along with those boxes
 - A.Rozhkov is working on the above issues